

ABSTRACT

5 The present invention provides a bump forming
apparatus (101, 501) which can prevent charge appearance
semiconductor substrates (201, 202) from pyroelectric
breakdown and physical failures, a method carried out by
the bump forming apparatus for removing charge of charge
appearance semiconductor substrates, a charge removing unit
for charge appearance semiconductor substrates, and a
10 charge appearance semiconductor substrate. At least when
the wafer is cooled after the bump bonding to the wafer,
electric charge accumulated to the wafer (202) because of
the cooling is removed through direct contact with a post-
forming bumps heating device (170), or the charge is
15 removed by a decrease in temperature control that charge
can be removed in a noncontact state. Therefore an amount
of charge of the wafer can be reduced in comparison with
the conventional art, so that the wafer is prevented from
pyroelectric breakdown and damage such as a break or the
20 like to the wafer itself.